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TIME OF PLANTING AS AFFECTING YIELDS OF RURAL NEW YORKER AND TRIUMPH POTATOES IN THE GREELEY, COLO., DISTRICT

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INTRODUCTION

The time of planting potatoes often has a decided influence on the yield and the quality of the crop. In the early days of the potato industry in the Greeley, Colo., district the planting of the late crop usually began about the middle of May and was completed by the last of the month. Because of injury to the tubers, locally termed "worm track," caused by the larva of the potato flea beetle (*Epitrix cucumeris* Harr.), the planting dates have become much delayed, and at the present time the late crop is generally planted between June 1 and June 15. Although the late planting may give some relief from the ravages of the flea beetle, it has by no means eliminated the trouble, and severe damage has been noted on the tubers of crops planted as late as the middle of July. The injury appears to be more severe on tubers that are left in the ground after they have become sufficiently ripe to be harvested and on those that are making very slow growth.

For many years the Peerless (Pearl) was the leading commercial variety of the Greeley district. Although this variety produced large yields, it was inclined to grow knotty or irregular-shaped tubers, especially on the heavier type of soils of the district. For that reason the Rural New Yorker has gradually replaced the Peerless and is now the leading commercial variety. The Triumph probably ranks second, and other varieties in the order of their importance are Russet Rural, Peerless, King, and Russet Burbank. The Peerless and Russet Burbank are grown chiefly on the sandy soils.

OUTLINE OF EXPERIMENTS

Studies on the effect of time of planting on yield were made with the Rural New Yorker¹ and the Triumph variety of potatoes for the years 1925 to 1929, inclusive, at the Colorado Potato Experiment Station, near Greeley, Colo. Throughout the experiment the same strains of seed were used, the Rural New Yorker strains being grown continuously at the station, while the Triumph was purchased from a seed grower who has retained this same strain of seed for at least 10 years.

The test plots consisted of four rows each in 1925 and 1926, and of eight rows from 1927-1929, inclusive. With the exception of 1926 the row lengths were 242 feet. In 1926 they were 484 feet long. All plots were planted in duplicate except in 1925. Tubers weighing from 3 to 10 ounces were selected for planting the test plots except in 1929, when whole seed was used. The tubers were cut into blocky seed pieces weighing from 1½ to 2 ounces, after which the seed was spread out on the dugout floor for six or seven days, until the cut surface had healed over. Seed planted in 1929 varied from 1½ to 3 ounces in weight.

The first plantings were made May 20 or as soon thereafter as possible. The next planting date was about June 2, while the last plantings were made about June 12. All plots received light frequent applications of irrigation water when conditions seemed to require it in order that the plants might make a continuous, vigorous growth. Cultivations followed irrigations until the vines shaded the ground. Triumphs planted about May 20 were generally sufficiently ripe to harvest about the middle of September, and those planted about June 12 were sufficiently ripe to harvest about September 24. With the Rural New Yorker no digging could generally be done until after frost, even on the earlier plantings, unless the frost held off until after the first week of October.

RESULTS OF EXPERIMENTS

The results of the five years' experiments with the two varieties are presented in Table 1 and are described more at length in the succeeding paragraphs.

¹ This is the Rural New Yorker No. 2, originated by E. S. Carman.

TABLE 1.—*Comparative influence of time of planting on yield of Rural New Yorker and Triumph potatoes at Greeley, Colo.*

Date planted	Rural New Yorker						Triumph					
	Rows	Length of rows	Date harvested	Acre yield			Rows	Length of rows	Date harvested	Acre yield		
				U. S. No. 1	Culls	Total				U. S. No. 1	Culls	Total
1925	No.	Feet		Bush.	Bush.	Bush.	No.	Feet		Bush.	Bush.	Bush.
May 22.....	4	242	Oct. 6....	224.00	33.38	257.38	4	242	Sept. 17..	190.00	61.13	251.13
June 2.....	4	242	Oct. 10...	255.38	21.25	276.63	4	242	Sept. 21..	235.00	56.63	291.63
June 12.....	4	242	Oct. 12....	256.63	41.87	298.50	4	242	Sept. 24..	300.25	74.88	375.13
1926												
May 20.....	4	484	Oct. 1....	353.87	18.94	372.81	4	484	Sept. 16..	307.00	26.94	333.94
June 2.....	4	484	---do....	372.81	27.50	400.31	4	484	Sept. 20..	386.56	29.44	416.00
June 12.....	4	484	---do....	342.44	38.81	381.25	4	484	Sept. 24..	403.31	41.69	445.00
1927												
May 20.....	8	242	Oct. 3....	338.62	23.19	361.81	8	242	Sept. 19..	187.69	21.94	209.63
June 2.....	8	242	Oct. 6....	271.00	35.13	306.13	8	242	---do....	213.38	28.00	241.38
June 11.....	8	242	---do....	233.50	42.13	275.63	8	242	Sept. 23..	236.38	27.50	263.88
1928												
May 20.....	8	242	Oct. 8....	279.25	14.19	293.44	8	242	Sept. 17..	143.69	36.12	179.81
June 2.....	8	242	Oct. 12...	218.81	17.31	236.12	8	242	Sept. 21..	186.88	30.62	217.50
June 12.....	8	242	Oct. 15...	130.56	18.00	148.56	8	242	Sept. 24..	128.13	18.06	146.19
1929												
May 21.....	8	242	Sept. 24..	194.69	49.12	243.81	8	242	Sept. 18..	173.56	50.94	224.50
June 3.....	8	242	---do....	172.50	60.25	232.75	8	242	Sept. 21..	300.56	37.19	337.75
June 13.....	8	242	---do....	139.25	74.19	213.44	8	242	---do....	340.67	33.31	373.98

RURAL NEW YORKER

The growing season for the year 1925 was about normal for the district. Between May 1 and September 30, 9.42 inches of rain fell. A killing frost did not occur that year until October 9. The land planted to Rural New Yorker in 1925 was in a somewhat low state of fertility, and large yields were not obtained. The potatoes planted May 22 produced 224 bushels of primes² and 33.38 bushels of culls per acre, or a total of 257.38 bushels per acre. Very little difference in yield resulted from seed planted June 2 and June 12, the former producing 255.38 and the latter 256.63 bushels of primes per acre.

The year 1926 was below normal in rainfall, the precipitation from April 1 to September 30 being but 5.70 inches. With the aid of light, frequent irrigations, however, very satisfactory yields were obtained, notwithstanding the fact that a killing frost occurred on September 23. The June 2 plantings produced 372.81 bushels of primes, the total yield being 400.31 bushels per acre. By referring to Table 1, it will be noted that the plantings of June 2 produced 18.94 bushels more of primes per acre than those of May 20, and 30.37 bushels more than the June 12 plantings.

The growing season of 1927 was about normal as to rainfall, 9.43 inches being recorded at the station from April 1 to September 30, although only a trace of moisture was recorded in September. On July 13 a severe hailstorm badly damaged the vines. A moderate frost occurred on September 26 and a killing frost October 1. The

² All the tubers passing over the 1½-inch square-mesh screen of the sorter were considered as primes; those passing through it were classed as culls. This statement applies to all of the experimental data presented.

earlier plantings recovered more rapidly from the hail injury and produced the largest yield. It will be noted upon comparison of the data in Table 1 that the yields in 1927 of the Rural New Yorker decreased with the later dates of plantings. The May 20 plantings produced 67.62 bushels more primes per acre than those planted 13 days later, and 105.12 bushels more than those planted 22 days later.

The growing season of 1928 was above normal in precipitation, 14.90 inches of rain being recorded between April 1 and September 30. During June, 6.80 inches fell, and during July, 2.84 inches. However, yields were low in that year because of hail injury. Severe hailstorms occurred at the station on June 29, July 19, and July 29. A killing frost did not occur in this year until the middle of October. Yields of Rural New Yorker, planted on the later dates again decreased. The May 20 plantings produced 279.25 bushels of primes per acre and 14.19 bushels of culls, or a total of 293.44 bushels per acre. It will be noted upon referring to Table 1 that the May 20 plantings produced 60.44 bushels more primes per acre than the June 2 plantings and 148.69 bushels more primes than the June 12 plantings. It is believed that the larger yield of the early planted plots in 1927 and 1928 was due to the rapid recovery of the plants after hail injury, which was possible largely because the plants were stronger and their root systems more extensive.

The rainfall for 1929 was again about normal for the growing season, there being 9.52 inches recorded at the station. However, yields of Rural New Yorker were materially decreased by a killing frost that occurred on September 8. The plantings of May 21 gave 194.69 bushels of primes per acre, those planted June 1, 172.50 bushels, while the plots planted to Rural New Yorker June 13 produced but 139.25 bushels of primes per acre.

The yields of Rural New Yorker for the five years are shown graphically in Figure 1.

TRIUMPH

In 1920, while testing strains of the Triumph potato, it was discovered that this variety planted late made a very satisfactory crop. Tests proved that it could be planted at the station as late as the middle of June and a mature crop be harvested during the latter part of September. It was found that where good strains of seed were used and proper irrigation methods were followed this early crop variety would produce yields comparable with the late-crop varieties of the district. The Triumph has also been in good demand when placed on the market for winter consumption.

As previously stated, the growing season of 1925 was about normal as to rainfall, and the first killing frost occurred October 9. The plots of Triumph planted May 22 produced 190 bushels of primes per acre, the total yield being 251.13 bushels per acre. The plantings of June 2 produced 235 bushels of primes and 56.63 bushels of culls, a total production of 291.63 bushels per acre, whereas the plots planted June 12 produced 300.25 bushels of primes and a total of 375.13 bushels per acre.

The rainfall for 1926 was low, and a killing frost occurred September 23, but very satisfactory yields of Triumph were produced. It will be noted upon comparison of the data in Table 1 that yields were increased with the later planting dates. Plantings of June 2

produced 79.56 bushels more primes than the May 20 plantings, and those of June 12 produced 16.75 bushels more than those planted 10 days earlier.

In 1927 the yields of Triumph were reduced by a severe hailstorm on July 13. Plantings of June 2 produced 25.69 bushels more primes than May 20 plantings, and those planted June 11 produced 23 bushels more primes than the June 2 plantings.

Yields in 1928 were materially decreased by hailstorms that occurred on June 29, July 19, and July 29. It will be noted upon comparison of yields in Table 1 that this is the only year included in the test that the late plantings of Triumph did not produce the highest yields.

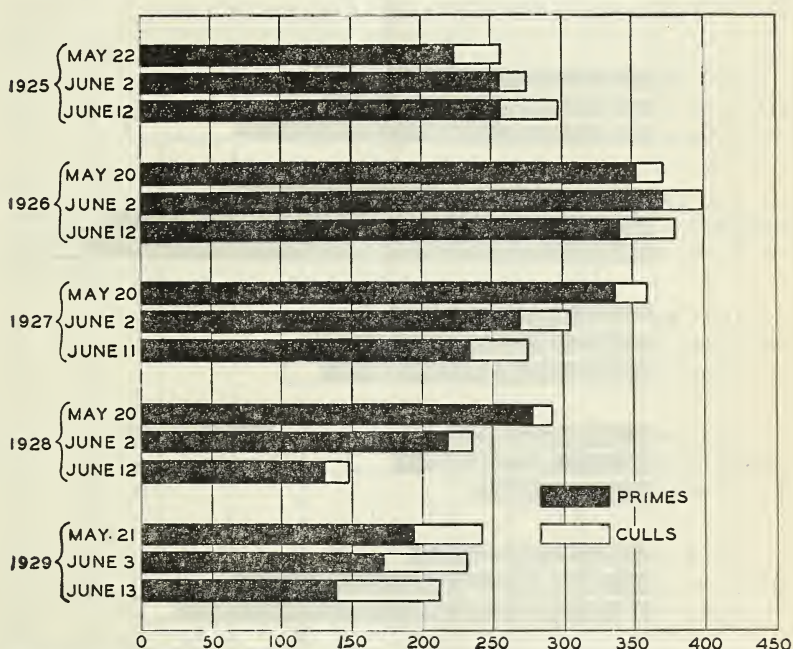


FIGURE 1.—Average yields, in bushels per acre, secured in five years, from Rural New Yorker potatoes planted on different dates at Greeley, Colo.

As previously stated, in 1929 a killing frost occurred on September 8. The yields from Rural New Yorker plantings this year were probably cut in half, but those of Triumph were not so seriously affected even in the late-planted plots. The May 21 plantings of Triumph produced 173.56 bushels of primes and 50.94 bushels of culls, a total of 224.50 bushels per acre. Plots planted June 3 produced 300.56 bushels of primes and 37.19 bushels of culls, a total of 337.75 bushels per acre; whereas the plots planted June 13 produced 340.67 bushels of primes and 33.31 bushels of culls, the total yield being 373.98 bushels per acre.

The yields of the Triumph variety for the five years are shown graphically in Figure 2.

DISCUSSION

Tests with Rural New Yorker reveal the fact that seasonal conditions have a decided influence on the yields obtained in different years. In seasons of hail injury to the vines or extremely early frost, the early plantings have given the highest yields. The 5-year average acre production, in bushels, of potatoes planted on these three dates, was as follows: Early planting, primes 278.1, total 305.9; medium planting, primes 258.1, total 290.4; late planting, primes 220.5, total 263.5. Late plantings have not eliminated the flea-beetle injury on the tubers, and some other controlling measure must be found before relief is obtained. Late plantings frequently produce immature tubers at the time of harvest.

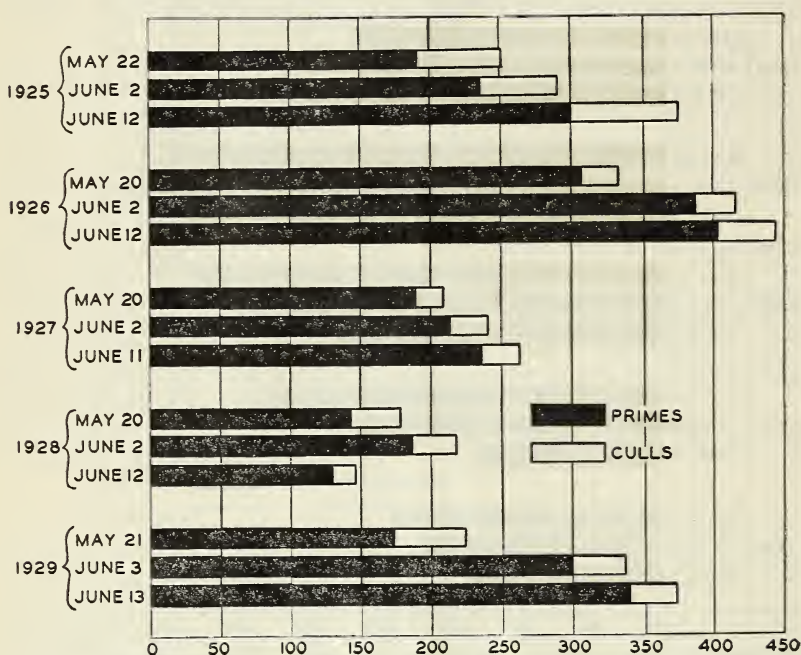


FIGURE 2.—Average yields, in bushels per acre, secured in five years, from Triumph potatoes planted on different dates at Greeley, Colo.

The Triumph, which is an early variety and one not noted for quality, has proved to be fairly satisfactory for the late crop in the Greeley district. In Figure 2 it will be noted that yields of this variety were usually increased by lateness of planting. Triumphs planted as late as June 12 to 15 may be harvested the latter part of September; those planted May 20 can be harvested about the middle of September. Until some better variety can be found to take its place, growers of late potatoes will find it convenient and profitable to grow a small acreage of Triumph.

Sugar-beet growers who wish to include potatoes in their rotation will find this variety particularly adaptable because the crop can be dug before the sugar-beet harvest begins. If large yields are desired, good seed must be planted. This is especially true of the

Triumph; and although all cultivation operations must be carefully conducted, proper irrigation is of paramount importance if maximum yields are to be obtained.

The soil at the station is a gravelly loam, medium heavy, and not well adapted to early crop production. With the late crop, tuber development is earlier in a warm sandy soil than in a heavier soil, and planting dates may therefore be delayed. Tuber development may often be made earlier by forcing the plant growth with early irrigation water. Frequent light irrigations will aid in producing uniform tubers and will also hasten the ripening period.

SUMMARY

Studies on the time of planting were made with the Rural New Yorker and Triumph varieties of potato grown for the late crop in the five years 1925 to 1929, inclusive, at the Colorado Potato Experiment Station, near Greeley, Colo. The planting dates were approximately May 20, June 2, and June 12.

The results of the five years' tests with Rural New Yorker indicate that early plantings tend to be superior to plantings made as late as June 12 from the standpoint of both yield and maturity.

Except for the last planting in 1928, the yields of Triumph increased with the lateness of the planting, the plantings of June 12 producing much larger yields than the earlier ones.

